CRATE
CA60D
Acoustic
Amplifier
with
Digital Signal
Processing
Owner's
Guide

About the Crate Acoustic CA60D:

Designed for the performing artist, Crate's *CA60D Acoustic Amplifier* gives you **more** of what you want. More power. More clarity. More control. And, more freedom. Imagine: microphone quality sound, *without feedback.* And without being "chained" to a mic stand!

More power: twin 30-watt RMS power amplifiers drive a pair of specially designed high fidelity 6-1/4" transducers for plenty of volume and low end punch.

More clarity: a highly efficient Piezo tweeter provides clean crisp highs and natural midrange blend. A tweeter on / off switch on the rear panel allows you to deactivate the high frequency driver if desired.

More control: two independent channels, each with its own gain and reverb/effects controls. The Instrument channel features an "Active/Piezo" switch to properly match the pickups of your instrument, a "Shape" switch for a richer soumd, and a three-band rotary EQ. An easy-to-use feedback elimination circuit with frequency select and cut controls lets you kill feedback without sacrificing sound quality. Plus a footswitchable chorus with depth and rate controls.

The Vocal/Aux channel offers both low and high impedance inputs and allows the use of a rhythm machine, background tape, or another mic or instrument.

Still more: The master section features reverb return control and the master level control. A footswitch jack on the rear panel provides control for reverb and chorus. Level-controllable XLR and 1/4" balanced line outs allow you to patch into house sound boards or recording consoles, plus an effects loop line-in/line-out setup allows connection of external effects.

Enough already? Not for us. The *CA60D* features Crate's *Digital Signal Processing* (**DSP**) for a variety of digital reverbs, effects and delays specifically designed for acoustic instruments.

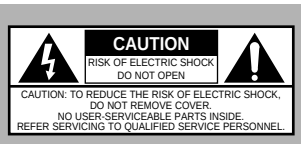
The *CA60D* was designed, evaluated, tweaked and redesigned by musicians and music loving engineers. Highly sophisticated computer driven assembly machines and highly skilled assemblers use only the finest components to produce each amp. Every cabinet is hand-built and hand-covered by trained craftsmen. The final assembled product is tested – and played – by skilled musician/technicians. It is only *after* the amplifier has passed this barrage of picky people that it gets packed up and shipped out.

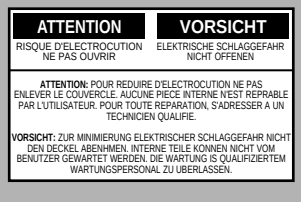
The *CA60D Acoustic Amplifier.* Designed to be its best, so you can ***sound your best!***

Crate Acoustic amplifiers are Made With Pride in the U.S.A.

To get this amplifier to sound its best, read this owner's guide prior to its use.

To keep this amplifier looking its best, avoid abrasive cleansers. Wipe the cabinet clean using a slightly dampened cloth. Never use brass cleaners on the hardware since they could damage their protective coatings.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER.
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.


ATTENTION
RISQUE D'ELECTROCUTION
NE PAS OUVRIR
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ELEKTRISCHE SCHLAGGEFAHR
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ATTENTION: POUR REDUIRE D'ELECTROCUTION NE PAS
ENLEVER LE COUVERCLE. AUCUNE PIECE INTERNE N'EST REPRABLE
PAR L'UTILISATEUR. POUR TOUTE REPARATION, S'ADRESSER A UN
TECHNICIEN QUALIFIE.
VORSICHT: ZUR MINIMIERUNG ELEKTRISCHER SCHLAGGEFAHR NICHT
DEN DECKEL ABENHMEN. INTERNE TEILE KONNEN NICHT VOM
BENUTZER GEWARTET WERDEN. DIE WARTUNG IS QUALIFIZIERTEM
WARTUNGSPERSONAL ZU UBERLASSEN.

THIS EQUIPMENT HAS BEEN DESIGNED AND ENGINEERED TO PROVIDE SAFE AND RELIABLE OPERATION. IN ORDER TO PROLONG THE LIFE OF THE UNIT AND PREVENT ACCIDENTAL DAMAGES OR INJURY, PLEASE FOLLOW THESE PRECAUTIONARY GUIDELINES:

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT OPEN CHASSIS; DO NOT DEFEAT OR REMOVE THE GROUND PIN OF THE POWER CORD; CONNECT ONLY TO A PROPERLY GROUNDED AC POWER OUTLET.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

CAUTION: NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

CAUTION: OUR AMPLIFIERS ARE CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS. CONTINUED EXPOSURE TO HIGH SOUND PRESSURE LEVELS CAN CAUSE PERMANENT HEARING IMPAIRMENT OR LOSS. USER CAUTION IS ADVISED AND EAR PROTECTION IS RECOMMENDED IF UNIT IS OPERATED AT HIGH VOLUME.

EXPLANATION OF GRAPHICAL SYMBOLS:

= "DANGEROUS VOLTAGE"
"VOLTAJE PELIGROSO"
"DANGER HAUTE TENSION"
"GEFAHLICHE SPANNUNG"

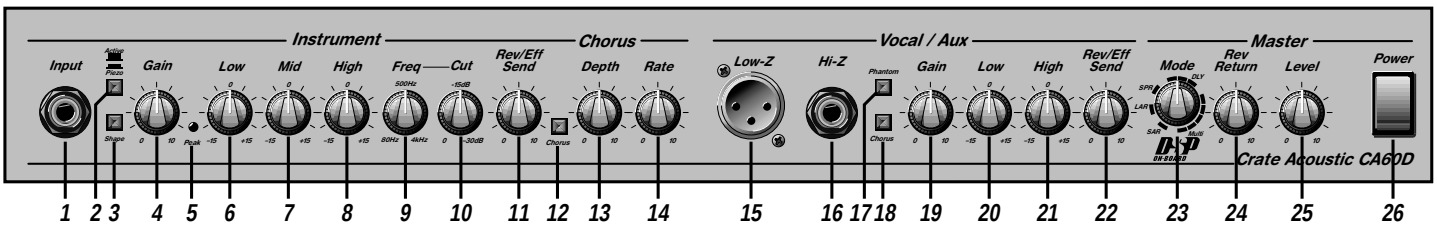
= "IT IS NECESSARY FOR THE USER TO REFER TO THE INSTRUCTION MANUAL"
"ES NECESARIO QUE EL USUARIO SE REFIERA AL MANUAL DE INSTRUCCIONES."
"REFERREZ-VOUS AU MANUAL D'UTILISATION"
"UNBEDINGT IN DER BEDIENUNGSANLEITUNG NACHSCHLAGEN"

Crate continually develops new products, as well as improves existing ones. For this reason, the specifications and information in this manual are subject to change without notice.

Technical Specifications:

Output Power Rating:	60 watts RMS total system power
Woofer Amp:	2 x 30 watts RMS @1% THD
Inst. Channel: Low:	+/-15dB @ 80Hz
Mid:	+/-15dB @ 650Hz
High:	+/-15dB @ 10kHz
Shape:	-25dB @ 600Hz
Input Impedance:	25k ohm (Active), 2.2M ohm (Piezo)
Input Sensitivity:	22mV RMS (Active), 9mV RMS (Piezo)
Sens. to Eff Send/Line out:	70mV
Max Input Signal:	6v RMS (17v peak to peak)
Feedback Elimination:	Freq: variable from 80Hz to 4kHz Cut: variable from -0 to -30dB
Voc./Aux Channel: Low:	+/-15dB @ 80Hz
High:	+/-15dB @ 10kHz
Input Impedance:	3k ohm (Lo-Z), 20k ohm (Hi-Z)
Input Sensitivity:	3mV RMS (Lo-Z), 15mV RMS (Hi-Z)
Effects Loop:	Line Out 1v RMS, Line In 1v RMS
Eff Return to Line Out Sens:	50mV
Eff Return In. Impedance:	11k ohm
Eff Send Out. Impedance:	2.2k ohm
Line Out Out. Impedance:	220 ohm (Lo-Z), 2.2k ohm (Hi-Z)
Internal Woofers:	2 x 6-1/4" w/polypropylene cones, rubber surrounds, 17.7oz magnet, 1" voice coil, 4 ohms, 50w RMS, 95dB 1w 1m
Internal Tweeter:	High efficiency Piezo, 110dB 1w 1m
Internal Crossover:	Passive type
Power Requirements:	120VAC, 60Hz, 60VA; 100/115VAC, 50/60Hz, 60VA; 230VAC, 50/60Hz, 60VA
Size and Weight:	13-1/2"H x 21-3/16"W x 10-1/4"D, 42 lbs.

On the Front Panel:



The Instrument channel:

1: Input. The signal output from your acoustic instrument may be connected here by means of a shielded instrument cable.

2: Active/Piezo switch. Use this switch to select the type of pickup on your instrument. For active electronic pickups, set the switch to "active" (switch out). For passive/magnetic pickups, set it to "piezo" (switch depressed).

3: Shape. This switch, when depressed, serves as a mid-cut control, adding fullness to the sound of your instrument.

4: Gain. This serves as the input level control for the instrument channel of the amplifier. For the best signal to noise ratio set this control so the Peak LED (#5) flashes when playing your instrument fairly hard.

5: Peak LED. This LED flashes when the signal level into the preamp approaches clipping. Adjust the Gain control (#4) until a strong signal from your instrument causes this LED to flash.

6: Low. This serves as the instrument channel's primary bass control. Adjust this control to get the best sounding bass response for your instrument. Excessive boost of the low control can cause an unnatural howling and should be avoided.

7: Mid. This serves as the instrument channel's primary midrange control. Adjust this control to get the best projection and midrange tones for your instrument.

8: High. This serves as the instrument channel's primary treble control. Adjust this control so your high notes and harmonic overtones are lively but not overpowering.

9: Freq. Use this control along with the Cut control (#10) to eliminate instrument feedback. For information on the proper use of this control, please read the section entitled ***"To Eliminate Instrument Feedback."***

10: Cut. Use this control along with the Freq control (#9) to eliminate instrument feedback. For information on the proper use of this control, please read the section entitled ***"To Eliminate Instrument Feedback."***

11: Rev/Eff send. Use this control to adjust the amount of internal reverb and/or external effect (if used) for the instrument channel.

12: Chorus On/Off switch. This switch, when depressed, applies the internal chorus effect to the instrument channel.

13: Chorus Depth. Use this control to adjust the magnitude of the chorus effect. Rotating this control clockwise increases the intensity of the effect.

14: Chorus Rate. Use this control to adjust the rate of the chorus effect. Rotating this control clockwise increases the rate at which the effect occurs.

The Vocal/Aux channel:

15: Low-Z input. The signal output from a low impedance microphone may be connected here by means of a shielded, balanced microphone cable terminated with an XLR connector.

16: Hi-Z input. The signal output from a high impedance microphone or a line level signal may be connected here by means of a shielded signal cable terminated with a 1/4" tip/sleeve connector.

17: Phantom Power switch. This switch, when depressed, applies 15 volts pahntom power to pins 2 and 3 of the Low-Z input jack (#15), for proper operation of microphones requiring pahntom power. (Mics not needing phantom power will not ne affected by this switch.)

18: Chorus On/Off switch. This switch, when depressed, applies the internal chorus effect to the vocal/aux channel. (Chorus is only available for this channel when the instrument channel's chorus switch, #12, is depressed.)

19: Gain. This serves as the input level control for the vocal/aux channel of the amplifier. Adjust this control for the best mix with the signals from the instrument channel.

20: Low. This serves as the vocal/aux channel's primary bass control. Adjust this control to get the best sounding bass response for this channel. Excessive boost of the low control can cause an unnatural howling and should be avoided.

21: High. This serves as the vocal/aux channel's primary treble control. Adjust this control so your high notes and harmonic overtones are lively but not overpowering.

22: Rev/eff send. Use this control to adjust the amount of internal reverb and/or external effect (if used) for the vocal/aux channel.

The Master Section:

23: DSP Mode. Use this control to select the type of digital signal processing applied to the output signal. For a listing of the effects, please see the section entitled ***"The DSP Section."***

24: Rev Ret. Use this control to adjust the amount of the internal reverb – the further you turn to the right the deeper the effect.

25: Level. Use this control to set the overall output level of the amplifier.

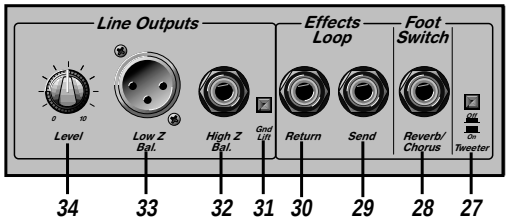
26: Power Switch. Use this switch to apply power to the amplifier: the amp is on when the top of the switch is depressed, off when the bottom of the switch is depressed. This switch will illuminate when the amplifier is on.

To Eliminate Instrument Feedback:

One of the most common problems encountered when amplifying acoustic instruments, especially in small environments, is feedback. Acoustic instruments typically have inherent qualities which cause resonant feedback at specific frequencies. Instrument tone controls and sound board equalizers are helpful in getting rid of the problem, but they typically operate around relatively wide frequency bands. This almost always means the musician must sacrifice sound quality in his quest to do away with feedback. But since Crate's feedback elimination circuit isolates only the offending frequency, instrument feedback from the CA60D can be eliminated without affecting the overall sound.

Chances are, you may not have a problem with feedback at all. In that case, leave the CA60D's Freq and Cut controls fully counter-clockwise. However, if you do encounter feedback while playing, set the Cut control to -30dB (fully clockwise) and adjust the Freq control until the feedback is gone. Reduce the Cut to the 12 o'clock position and readjust the Freq control as needed. Continue reducing the Cut control and readjusting the Freq control until there is no more feedback with the Cut control as far counter-clockwise as possible. This approach effectively eliminates instrument feedback without sacrificing the quality of your sound.

On the Rear Panel:



27: **Tweeter On/Off switch.** This switch, when depressed, deactivates the CA60D's internal tweeter.

28: **Footswitch.** Connect the supplied two-button footswitch here for remote on/off control of the internal reverb and chorus. (When connected, the footswitch overrides the front panel chorus on/off switch.)

Note: This is a STEREO jack: tip controls the chorus, ring controls the reverb, sleeve is ground. Use only a footswitch equipped with a *stereo* 1/4" plug.

29: **Effects Loop Send.** When using an external signal processor, connect this jack to the input of the effect by means of a shielded signal cable.

30: **Effects Loop Return.** When using an external signal processor, connect this jack to the output of the effect by means of a shielded signal cable.

31: **Ground Lift.** This switch, when depressed, electronically disconnects the low Z balanced output jack's chassis ground connection. If you experience excessive noise when using the low Z balanced output jack, depress this switch.

32: **High Z Bal.** Use this jack to connect a high impedance, line level signal to a house sound board, a recording console or an external power amplifier by means of an 1/4" stereo plug-terminated cable. (Ring is signal +, tip is signal -, and sleeve is ground.)

33: **Low Z Bal.** Use this jack to connect a low impedance, line level signal to a house sound board, a recording console or an external power amplifier by means of an XLR-terminated cable. (Pin 1 is ground, pin 2 is signal +, and pin 3 is signal -.)

34: **Line Out Level.** Use this control to adjust the output level of the line out signal. (This control works independently from the amplifier's master level control.)

Not Shown:

Power cord. Connect the end of this cord to a suitable source of line voltage. Refer to the voltage information on the back of the amplifier for its voltage and current requirements.

Note: This is a grounded plug. **To avoid the possibility of electric shock, DO NOT defeat the ground connection in any way!**

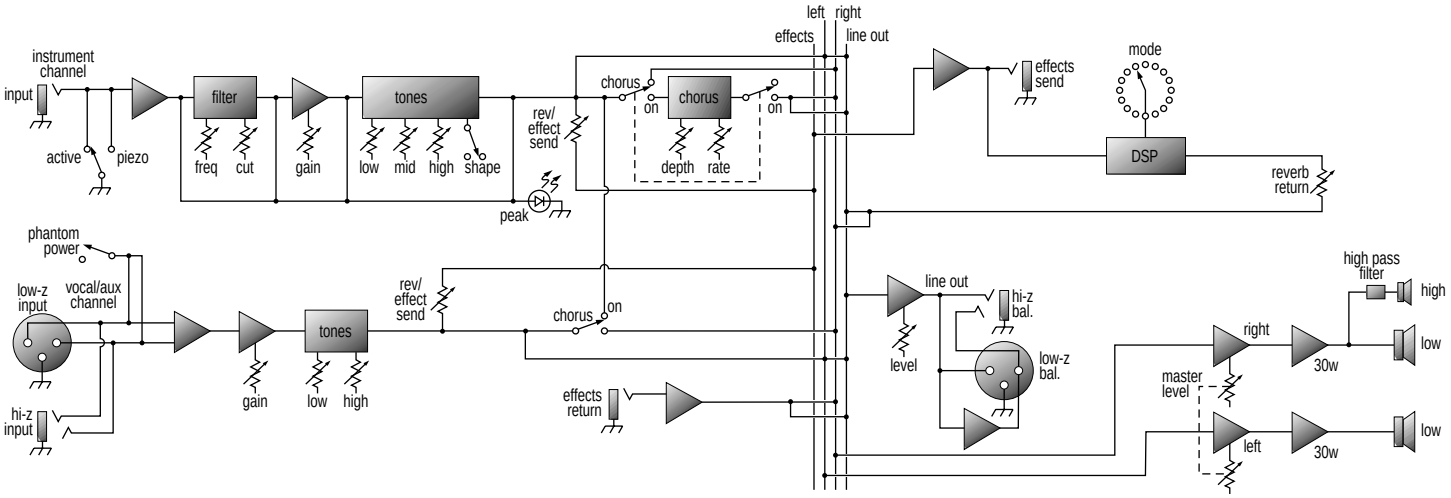
The DSP Section:

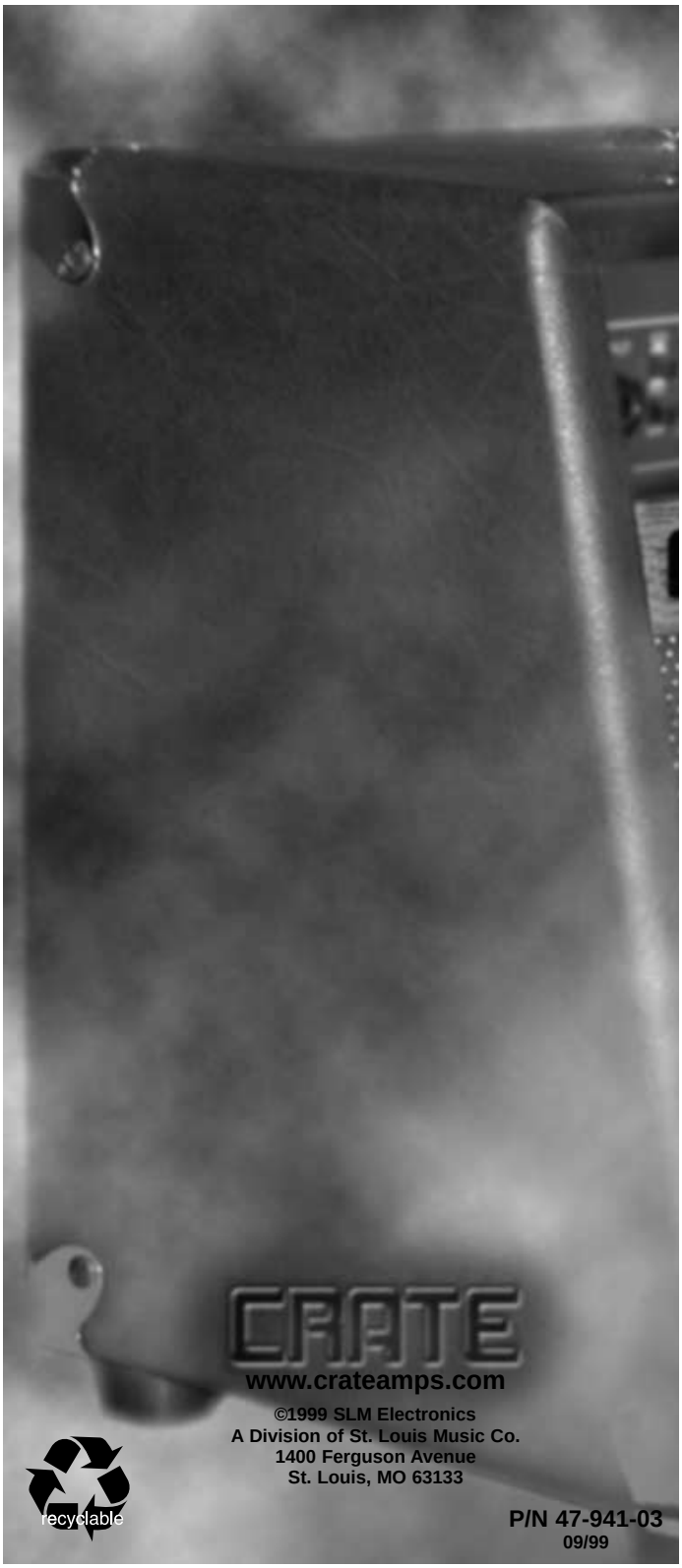
The CA60D features Crate's On-Board *Digital Signal Processing* (**DSP**) technology that was designed specifically for use with acoustic instruments and vocals. This provides a large selection of digital reverbs, effects and delays. Select the type of effect desired by rotating the Mode control (#23). This control is divided into five sections: Small Area Reverbs (**SAR**), Large Area Reverbs (**LAR**), Special Reverbs (**SPR**), Delays (**DLY**) and Multiple Effects (**Multi**).

The following chart provides a list of the **DSP** settings along with a brief description of each effect.

SAR:	**Small Room**	8' x 8' empty room w/hardwood floor
	Small Rehearsal Hall	20' x 40' hall, wood floors, hard walls
LAR:	**Large Hall**	50' x 100' hall, about 50 persons
	Concert Hall	5000-seat hall, full crowd
SPR:	**Plate Reverb**	Simulates studio steel plate reverb
	Spring Reverb	Simulates multi-spring reverb tank
DLY:	**Slapback, short**	125ms delay + reverb
	Slapback, Med-short	240ms delay + reverb
	Slapback, Medium	350ms delay + reverb
	Slapback, Long	557ms delay - 630' travel time
Multi:	**Short Med. Surface**	280ms delay w/21.8% regen + reverb
	Medium Hard Surface	335ms delay w/26.5% regen + reverb
	Chor-Delay	400ms delay with modulation
	Chor-Verb	Hall reverb w/modulated pre-delay
	Slap-Verb	Medium hall w/200ms pre-delay
	Instrument Doubler	Simulates second track slightly out-of-sync

CA60D Block Diagram:





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